PART M
CONFINED SPACES

WAC

WAC 296-62-141 Permit-required confined spaces.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-141, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14100 Scope and application.

(1) Scope. This part contains minimum requirements for practices and procedures to protect employees in all industries from the hazards of entry and/or work in permit-required confined spaces.

(2) Application. Part M (Permit-required confined spaces) applies to all employers under the jurisdiction of the Washington Industrial Safety and Health Act, chapter 49.17 RCW. Part M may be augmented by more protective requirements for confined spaces or areas in vertical standards. Certain industry specific vertical standards are more protective than chapter 296-62 WAC, Part M. Where there is a conflict between an industry specific vertical standard and chapter 296-62 WAC, Part M, the vertical standard will apply.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14100, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14105 Definitions.

"Acceptable entry conditions" means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

"Attendant" means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

"Authorized entrant" means an employee who is authorized by the employer to enter a permit space.

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"Blanking or blinding" means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore. It is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

"Confined space" means a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit (For example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- Is not designed for continuous employee occupancy.

"Double block and bleed" means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

"Emergency" means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

"Engulfment" means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be inhaled to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

"Entry" means the action by which a person passes through an opening into a permit-required confined space and includes work activities in that space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Note: If the opening is large enough for the worker to fully enter the space a permit is required even for partial body entry. Permits are not required for partial body entry where the opening is not large enough for full entry, although other standards such as lockout-tagout or respiratory protection may apply.

"Entry permit (permit)" means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in WAC 296-62-14509.

"Entry supervisor" means the person (such as the employer, crew leader, or crew chief) responsible for:

- Determining if acceptable entry conditions are present at a permit space where entry is planned;
- Authorizing entry and overseeing entry operations; and
- Terminating entry as required by this part.

Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of ten percent of its lower flammable limit (LFL);
- Airborne combustible dust at a concentration that meets or exceeds its LFL;

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Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet (1.52 m) or less.

- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- Atmospheric concentration of any substance which may exceed a permissible exposure limit is published in chapter 296-62 WAC, Parts F, G, H, and I, general occupational health standards;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

- Any other atmospheric condition that is immediately dangerous to life or health.

Note: For air contaminants for which WISHA has not determined a dose or permissible exposure limit, other sources of information, such as material safety data sheets that comply with the hazard communication standard, chapter 296-62 WAC, Part C, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

"Hot work permit" means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

"Immediately dangerous to life or health (IDLH)" means any condition that:

- Poses an immediate or delayed threat to life; or
- Would cause irreversible adverse health effects; or
- Would interfere with an individual's ability to escape unaided from a permit space.

Note: Some materials - hydrogen fluoride gas and cadmium vapor, for example - may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

"Inerting" means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note: This procedure produces an IDLH oxygen-deficient atmosphere.

"Isolation" means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

"Line breaking" means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

"Nonpermit confined space" means a confined space that does not contain any physical hazards or any actual or potential atmospheric hazards capable of causing death or serious physical harm.

"Oxygen deficient atmosphere" means an atmosphere containing less than 19.5 percent oxygen by volume.

WAC 296-62-14105 (Cont.)

"Oxygen enriched atmosphere" means an atmosphere containing more than 23.5 percent oxygen by volume.

"Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

"Permit-required confined space program (permit space program)" means the employer's overall program for:

- Controlling, and, where appropriate, for protecting employees from, permit space hazards; and
- Regulating employee entry into permit spaces.

"Permit system" means the employer's written procedure for:

- Preparing and issuing permits for entry; and
- Returning the permit space to service following termination of entry.

"Prohibited condition" means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

"Rescue service" means the personnel designated to rescue employees from permit spaces.

"Retrieval system" means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for nonentry rescue of persons from permit spaces.

"Testing" means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14105, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14110 General requirements.

(1) The employer must evaluate the workplace to determine if confined spaces are present. A confined space must be assumed to be a permit-required space unless it can be documented to be a nonpermit-confined space as required in subsection (2) of this section.

Note: Proper application of the decision flow chart in WAC 296-62-14171, Appendix A, would facilitate compliance with this requirement.

(2) A confined space may be classified as a nonpermit-confined space under the following conditions and procedures:

(a) If the confined space poses no actual or potential atmospheric hazards.

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(b) If the confined space has no other recognized health or safety hazards including engulfment in solid or liquid material, electrical shock, or moving parts.

(c) If all hazards within the space are eliminated without entry into the space, the confined space may be classified as a nonpermit confined space for as long as the hazards remain eliminated.

(d) If it is necessary to enter the confined space to eliminate hazards, it must be assumed to be a permit space and such entry must be performed under WAC 296-62-14115 through 296-62-14150. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a nonpermit confined space for as long as the hazards remain eliminated.

Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. Subsections (6) and (7) of this section cover permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

(e) The employer must:

(i) Document that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination.

(ii) Make the certification available to each employee entering the space or to that employee's authorized representative.

(f) When there are changes in the use or configuration of a nonpermit confined space that might increase the hazards to entrants, the employer must reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

(g) If hazards arise within a confined space that has been classified as a nonpermit space under this subsection, each employee in the space must exit the space. The employer must then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with chapter 296-62 WAC, Part M.

(3) If the workplace contains permit-required confined spaces, the employer must inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Note: A sign reading "DANGER-PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement for a sign.

(4) If the employer decides that its employees will not enter permit spaces, the employer must:

- Take effective measures to prevent its employees from entering the permit spaces; and
- Comply with subsections (1), (3), and (8) of this section.

(5) If the employer decides that its employees will enter permit spaces, the employer must:

(a) Follow the procedures outlined in WAC 296-62-14115 through 296-62-14155; and

(b) Develop and implement a written permit space program that complies with this part; and

WAC 296-62-14110 (Cont.)

(c) Make the written program available for inspection by employees and their authorized representatives.

(6) An employer may use the alternate entry procedures specified in subsection (7) of this section for entering a permit space under the following conditions:

(a) The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;

(b) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

(c) The employer develops or has monitoring and inspection data that supports the demonstrations required by (a) and (b) of this subsection;

(d) If an initial entry of the permit space is necessary to obtain the data required by (c) of this subsection, the entry must be performed in compliance with the permit required confined space procedures outlined in WAC 296-62-14115 through 296-62-14150; and

(e) The determinations and supporting data required by (a), (b), and (c) of this subsection are documented by the employer and are made available to each employee who enters the permit space or to that employee's authorized representative.

(7) Alternate procedures for entering permit confined spaces.

The following alternate procedures apply to entry into permit spaces that meet the conditions set forth in subsection (6) of this section.

(a) During permit space entry using these alternate procedures an employer need not comply with WAC 296-62-14115 through 296-62-14125 and WAC 296-62-14135 through 296-62-14150. Training and employee participation requirements of WAC 296-62-14130 and 296-62-14155 still apply.

(b) Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.

(c) When entrance covers are removed, the opening must be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and will protect each employee working in the confined space from objects falling into the space.

(d) Before an employee enters the confined space, the internal atmosphere must be tested, with a calibrated direct-reading instrument, for the following conditions in the order given below:

Any employee who enters the space, or that employee’s authorized representative, must be provided an opportunity to observe the preentry testing required by this paragraph.

(i) Oxygen content,

(ii) Flammable gases and vapors, and

(iii) Potential toxic air contaminants.

WAC 296-62-14110 (Cont.)

(e) There must be no hazardous atmosphere within the space whenever any employee is inside the space.

(f) Continuous forced air ventilation must be used, as follows:

(i) An employee must not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

(ii) The forced air ventilation must:

- Be directed to ventilate the immediate areas where an employee is or will be present within the space; and
- Continue until all employees have left the space;

(iii) The air supply for the forced air ventilation must be from a clean source and may not increase the hazards in the space.

(g) The atmosphere within the space must be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space, or that employee's authorized representative, shall be provided with an opportunity to observe the periodic testing required by this subsection.

(h) If a hazardous atmosphere is detected during entry:

(i) Each employee must leave the space immediately;

(ii) The space must be evaluated to determine how the hazardous atmosphere developed; and

(iii) Measures must be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

(i) The employer must verify that:

- The space is safe for entry; and
- The preentry measures required by (a), (b), and (c) of this subsection have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification is made before entry and available to each employee entering the space.

(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer must:

(a) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this standard;

(b) Inform the contractor of the hazards identified and the host employer's experience with each permit space to be entered;

(c) Inform the contractor of any precautions or procedures that the host employer requires for the protection of employees in or near permit spaces where contractor personnel will be working;

WAC 296-62-14110 (Cont.)

(d) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by WAC 296-62-14115(11); and

(e) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations must:

(a) Obtain any available information regarding permit space hazards and entry operations from the host employer;

(b) Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by WAC 296-62-14115(11); and

(c) Inform the host employer either through a debriefing or during the entry operation of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14110, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14115 Permit-required confined space program (permit space program). When the employer decides employees will enter a permit-required confined space, the employer must:

(1) Implement the measures necessary to prevent unauthorized entry;

(2) Identify and evaluate the hazards of permit spaces before employees enter them;

(3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

(a) Specify acceptable entry conditions;

(b) Provide each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;

(c) Isolate the permit space;

(d) Purge, inert, flush, or ventilate the permit space as necessary to eliminate or control atmospheric hazards;

(e) Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

(f) Verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

(4) Provide the following equipment (specified in (a) through (i) of this subsection) at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly:

WAC 296-62-14115 (Cont.)

(a) Testing and monitoring equipment needed to comply with subsection (5) of this section;

(b) Ventilating equipment needed to obtain acceptable entry conditions;

(c) Communications equipment necessary for compliance with WAC 296-62-14135(3) and 296-62-14140(5);

(d) Personal protective equipment when feasible engineering and work practice controls will not adequately protect employees;

(e) Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;

(f) Barriers and shields as required by subsection (3)(d) of this section;

(g) Equipment, such as ladders, needed for safe entry and exit by authorized entrants;

(h) Rescue and emergency equipment needed to comply with subsection (9) of this section, except when the equipment is provided by rescue services; and

(i) Any other equipment necessary for safe entry into and rescue from permit spaces.

(5) Evaluate permit space conditions as follows when entry operations are conducted:

(a) Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin;

(b) If isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), preentry testing shall be performed to the extent feasible before entry is authorized. If entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

(c) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations;

(d) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors;

(e) Provide each authorized entrant or that employee's authorized representative an opportunity to observe the preentry and any subsequent testing or monitoring of permit spaces;

(f) Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because the entrant or representative has reason to believe that the evaluation of that space may not have been adequate; and

(g) Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accord with this section.

WAC 296-62-14115 (Cont.)

Note: Atmospheric testing conducted in accordance with WAC 296-62-14172, Appendix B, would be considered as satisfying the requirements of this paragraph. For permit space operations in sewers, atmospheric testing conducted in accordance with Appendix B, as supplemented by WAC 296-62-14175, Appendix E, would be considered as satisfying the requirements of this subdivision.

(6) Provide at least one attendant outside the permit space into which entry is authorized during entry operations;

Note: Attendants may be assigned to monitor more than one permit space provided the duties described in WAC 296-62-14140 can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in WAC 296-62-14140 can be effectively performed for each permit space that is monitored. However, it is important to assess if it is appropriate or possible to have multiple permit spaces monitored by a single attendant or have attendants stationed at a location outside the monitored permit space. Due to the variability of permit space work environments, the appropriateness of how a permit space is monitored should be tailored to the requirements of the permit space and the work being performed.

(7) If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities under WAC 296-62-14140;

(8) Designate the persons who are to have active roles (for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by WAC 296-62-14130;

(9) Develop and implement procedures for:

- Summoning rescue and emergency services;
- Rescuing entrants from permit spaces;
- Providing necessary emergency services to rescued employees; and
- Preventing unauthorized personnel from attempting a rescue;

(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this part;

(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so they do not endanger each other;

(12) Develop and implement procedures (such as closing off a permit space and canceling the permit) to end the entry after entry operations have been completed;

(13) Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

Note: Examples of circumstances requiring the review of the permit space program are: Any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

WAC 296-62-14115 (Cont.)

(14) Review the permit space program, using the canceled permits retained under WAC 296-62-14120(6) within one year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

Note: Employers may perform a single annual review covering all entries performed during a twelve-month period. If no entry is performed during a twelve-month period, no review is necessary.

Note: WAC 296-62-14173, Appendix C, presents examples of permit space programs that are considered to comply with the requirements of WAC 296-62-14115.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14115, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14120 Permit system.

(1) Before entry is authorized, the employer must document the completion of measures required by WAC 296-62-14115(3) by preparing an entry permit.

Note: WAC 296-62-14174, Appendix D, presents examples of permits whose elements are considered to comply with the requirements of this part.

(2) Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry.

(3) The completed permit must be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that preentry preparations have been completed.

(4) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with WAC 296-62-14125(2).

(5) The entry supervisor must terminate entry and cancel the entry permit when:

(a) The entry operations covered by the entry permit have been completed; or

(b) A condition that is not allowed under the entry permit arises in or near the permit space.

(6) The employer must retain each canceled entry permit for at least one year to facilitate the review of the permit-required confined space program required by WAC 296-62-14115(14). Any problems encountered during an entry operation must be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14120, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14125 Required entry permit information. The entry permit that documents compliance with this standard and authorizes entry to a permit space must identify the following:

(1) The permit space to be entered;

(2) The purpose of the entry;

(3) The date and the authorized duration of the entry permit;

WAC 296-62-14125 (Cont.)

(4) The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

(5) The personnel, by name, currently serving as attendants;

(6) The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

(7) The hazards of the permit space to be entered;

(8) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

(9) The acceptable entry conditions;

(10) The results of initial and periodic tests performed under WAC 296-62-14115(5), accompanied by the names or initials of the testers and by an indication of when the tests were performed;

(11) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

(12) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

(13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this part;

(14) Any other necessary information, given the circumstances of the particular confined space, in order to ensure employee safety; and

(15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

Note: See WAC 296-62-14174, Appendix D, for a sample entry permit form.
[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14125, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14130 Training.

(1) The employer must provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this standard.

(2) Training must be provided to each affected employee in the following instances:

(a) Before the employee is first assigned duties under this section;

WAC 296-62-14130 (Cont.)

(b) Before there is a change in assigned duties;

(c) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

(d) Whenever the employer has reason to believe that:

- There are deviations from the permit space entry procedures required by WAC 296-62-14115(3); or
- There are inadequacies in the employee's knowledge or use of these procedures.

(3) The training must establish employee proficiency in the duties required by this standard and must introduce new or revised procedures, as necessary, for compliance with this part.

(4) The employer must certify that the training required by subsections (1) through (3) of this section has been accomplished. The certification must:

- Contain each employee's name, the signatures or initials of the trainers, and the dates of training;
- Be available for inspection by employees and their authorized representatives.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14130, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14135 Duties of authorized entrants. The employer must ensure that all authorized entrants:

(1) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Properly use equipment as required by WAC 296-62-14115(4);

(3) Communicate with the attendant as necessary to enable the attendant to:

- Monitor entrant status; and
- Alert entrants of the need to evacuate the space as required by WAC 296-62-14140(6);

(4) Alert the attendant whenever:

(a) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation; or

(b) The entrant detects a prohibited condition; and

(5) Exit from the permit space as quickly as possible whenever:

(a) An order to evacuate is given by the attendant or the entry supervisor;

(b) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;

(c) The entrant detects a prohibited condition; or

(d) An evacuation alarm is activated.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14135, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14140 Duties of attendants. The employer must ensure that each attendant:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Is aware of possible behavioral effects of hazard exposure in authorized entrants;

(3) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under WAC 296-62-14125(4) accurately identifies who is in the permit space;

(4) Remains outside the permit space during entry operations until relieved by another attendant;

Note: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by WAC 296-62-14150(1) and if they have been relieved as required by subsection (4) of this section.

(5) Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space under subsection (6) of this section;

(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

(a) If the attendant detects a prohibited condition;

(b) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

(c) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

(d) If the attendant cannot effectively and safely perform all the duties required under this section;

(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;

(8) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

(a) Warn the unauthorized persons that they must stay away from the permit space;

(b) Tell the unauthorized persons that they must exit immediately if they have entered the permit space; and

(c) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

(9) Performs nonentry rescues as specified by the employer's rescue procedure; and

(10) Performs no other duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14140, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14145 Duties of entry supervisors. The employer must ensure that each entry supervisor:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Verifies, by checking:

- That the appropriate entries have been made on the permit;
- That all tests specified by the permit have been conducted; and
- That all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

(3) Terminates the entry and cancels the permit as required by WAC 296-62-14120(5);

(4) Verifies that rescue services are available and that the means for summoning them are operable;

(5) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

(6) Determines that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained. This determination must be made whenever responsibility for a permit space entry operation is transferred and at regular intervals dictated by the hazards and operations performed within space.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14145, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14150 Rescue and emergency services.

(1) An employer who designates rescue and emergency services, under WAC 296-62-14115(9) of this part must:

(a) Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

Note: What will be considered timely will vary according to the specific hazards involved in each entry. For example, chapter 296-62 WAC, Part E, Respiratory protection, requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

(b) Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

(c) Select a rescue team or service from those evaluated that:

(i) Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;

(ii) Is equipped for and proficient in performing the needed rescue services;

(d) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

WAC 296-62-14150 (Cont.)

(e) Provide the rescue team or service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

Note: Nonmandatory WAC 296-62-14176, Appendix F, contains examples of criteria which employers can use in evaluating prospective rescue services.

(2) An employer whose employees have been designated to provide permit space rescue and emergency services must take the following measures.

(a) Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;

(b) Train affected employees to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant, as provided by WAC 296-62-14130 and 296-62-14135;

(c) Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). The employer must ensure that at least one member of the rescue team or service holding a current certification in first-aid and CPR is available; and

(d) Ensure that affected employees practice making permit space rescues at least once every twelve months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. These representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(3) Nonentry rescue. To facilitate nonentry rescue, retrieval systems or methods must be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems must meet the following requirements.

(a) Each authorized entrant must use a chest or full-body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant.

(b) Wristlets may be used in lieu of the chest or full-body harness if the employer can demonstrate that the use of a chest or full-body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

(c) The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

(d) A mechanical device must be available to retrieve personnel from vertical type permit spaces more than five feet (1.52 m) deep.

(4) If an injured entrant is exposed to a substance for which a material safety data sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information must be made available to the medical facility treating the exposed entrant.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14150, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14155 Employee participation.

(1) Employers must consult with affected employees and their authorized representatives on the development and implementation of all aspects of the permit space program required by WAC 296-62-14503.

(2) Employers must make available to affected employees and their authorized representatives all information required to be developed by this part.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14155, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14170 Appendices to WAC 296-62-141--Permit-required confined spaces.

Note: Appendices A through F serve to provide information and nonmandatory guidelines to assist employers and employees in complying with the appropriate requirements of this part.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14170, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14171 Appendix A--Permit-required confined space decision flow chart.

WAC 296-62-14171 (Cont.)

WAC 296-62-14171 (Cont.)

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14171, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14172 Appendix B--Procedures for atmospheric testing. Atmospheric testing is required for two distinct purposes:

- Evaluation of the hazards of the permit space; and
- Verification that acceptable entry conditions into that space exist.

(1) Evaluation testing.

- The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space.
- Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., WISHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, certified marine chemist, etc.,) based on evaluation of all serious hazards.

(2) Verification testing.

- The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions.
- Results of testing (i.e., actual concentration, etc.,) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

(3) Duration of testing. Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

(4) Testing stratified atmospheres.

- When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately four feet (1.22 m) in the direction of travel and to each side.
- If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

(5) Order of testing.

- A test for oxygen is performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere.
- Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors.
- If tests for toxic gases and vapors are necessary, they are performed last.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14172, filed 10/29/99, effective 02/01/2000.]]

WAC 296-62-14173 Appendix C--Examples of permit-required confined space programs.

Example 1. Workplace. Sewer entry.

(1) Potential hazards. The employees could be exposed to the following:

(a) Engulfment.

WAC 296-62-14173 (Cont.)

(b) Presence of toxic gases. Equal to or more than 10 ppm hydrogen sulfide measured as an eight-hour time-weighted average. If the presence of other toxic contaminants is suspected, specific monitoring programs will be developed.

(c) Presence of explosive/flammable gases. Equal to or greater than ten percent of the lower flammable limit (LFL).

(d) Oxygen deficiency. A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume.

(2) Entry without permit/attendant:

(a) Certification.

- Sewers may be entered without the need for a written permit or attendant provided that the space can be maintained in a safe condition for entry by mechanical ventilation alone, as provided in WAC 296-62-14110(5).
- All sewers must be considered permit-required confined spaces until the preentry procedures demonstrate otherwise.
- Any employee required or permitted to precheck or enter a sewer must have successfully completed, as a minimum, the training as required by the following sections of these procedures.
- A written copy of operating and rescue procedures as required by these procedures must be at the worksite for the duration of the job.
- The sewer preentry checklist must be completed by the LEAD WORKER before entry into a sewer. This list verifies completion of items listed below. This checklist must be kept at the job site for duration of the job.
- If circumstances dictate an interruption in the work, the sewer must be reevaluated and a new checklist must be completed.

(b) Control of atmospheric and engulfment hazards.

(i) Pumps and lines.

- All pumps and lines which may reasonably cause contaminants to flow into the sewer must be disconnected, blinded and locked out, or effectively isolated by other means to prevent development of dangerous air contamination or engulfment.
- Not all laterals to sewers or storm drains require blocking. However, where experience or knowledge of industrial use indicates there is a reasonable potential for contamination of air or engulfment into an occupied sewer, then all affected laterals must be blocked.
- If blocking and/or isolation requires entry into the sewer the provisions for entry into a permit-required confined space must be implemented.

(ii) Surveillance. The surrounding area must be surveyed to avoid hazards such as drifting vapors from the tanks, piping, or sewers.

(iii) Testing.

- The atmosphere within the sewer will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists.

WAC 296-62-14173 (Cont.)

- Detector tubes, alarm only gas monitors and explosion meters are examples of monitoring equipment that may be used to test sewer atmospheres.
- Testing must be performed by a LEAD WORKER who has successfully completed the gas detector training for the monitoring method to be used.
- The minimum parameters to be monitored are oxygen deficiency, LFL, and hydrogen sulfide concentration.
- A written record of the preentry test results must be made and kept at the worksite for the duration of the job.
- The supervisor will certify in writing, based upon the results of the preentry testing, that all hazards have been eliminated or controlled.
- Affected employees must be able to review the testing results.
- The most hazardous conditions will govern when work is being performed in two adjoining, connecting spaces.

(c) Entry procedures. Entry into and work within may proceed if:

- There are no nonatmospheric hazards present;
- The preentry tests show there is no dangerous air contamination and/or oxygen deficiency within the space and there is no reason to believe that any is likely to develop;
- Continuous testing of the atmosphere in the immediate vicinity of the workers within the space is accomplished;
- Workers will immediately leave the sewer when any of the gas monitor alarm set points are reached as defined; and
- Workers will not return to the area until a SUPERVISOR who has completed the gas detector training has used a direct reading gas detector to evaluate the situation and has determined that it is safe to enter.

(d) Rescue. Arrangements for rescue services are not required for entries that do not require a permit. See the rescue portion of subsection (3), below, for instructions regarding rescue planning where an entry permit is required.

(3) Entry permit required.

(a) Entry permits.

- All sewers are considered permit-required confined spaces until the preentry procedures demonstrate otherwise.
- Any employee required or permitted to precheck or enter a sewer must have successfully completed, as a minimum, the training as required by the following sections of these procedures.
- A written copy of operating and rescue procedures as required by these procedures must be at the worksite for the duration of the job.
- The sewer entry permit must be completed before approval can be given to enter a sewer.
- The permit verifies completion of items listed below.
- The permit must be kept at the job site for the duration of the job.
- If circumstances cause an interruption in the work or a change in the alarm conditions for which entry was approved, a new sewer entry permit must be completed.

(b) Control of atmospheric and engulfment hazards.

WAC 296-62-14173 (Cont.)

(i) Surveillance. The surrounding area must be surveyed to avoid hazards such as drifting vapors from tanks, piping or sewers.

(ii) Testing.

- The sewer atmosphere must be tested to determine whether dangerous air contamination and/or oxygen deficiency exists.
- A direct reading gas monitor must be used.
- Testing must be performed by a SUPERVISOR who has successfully completed the gas detector training for the monitoring method used.
- The minimum parameters to be monitored are oxygen deficiency, LFL and hydrogen sulfide concentration.
- A written record of the preentry test results must be made and kept at the worksite for the duration of the job.
- Affected employees must be able to review the testing results.
- The most hazardous conditions will govern when work is being performed in two adjoining, connected spaces.

(iii) Space ventilation.

- Mechanical ventilation systems, where applicable, must be set at one hundred percent outside air.
- Where possible, open additional manholes to increase air circulation.
- Use portable blowers to augment natural circulation if needed.
- After a suitable ventilating period, repeat the testing.
- Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated or controlled.

(c) Entry procedures. Under any of the following conditions:

- Testing demonstrates the existence of dangerous or deficient conditions and additional ventilation cannot reduce concentrations to safe levels;
- The atmosphere tests as safe but unsafe conditions can reasonably be expected to develop;
- It is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems and it is not practical or safe to deactivate such systems; or
- An emergency exists and it is not feasible to wait for preentry procedures to take effect.

The following procedures must be observed:

- All personnel must be trained.
- A self-contained breathing apparatus must be worn by any person entering the sewer.
- At least one worker must stand by the outside of the sewer ready to give assistance in case of emergency.
- The rescue workers must have a self-contained breathing apparatus available for immediate use.
- There must be at least one additional worker within sight or call of the standby worker.
- Continuous powered communications must be maintained between the worker within the sewer and standby personnel.

WAC 296-62-14173 (Cont.)

- If at any time there is any questionable action or nonmovement by the worker inside, a verbal check will be made. If there is no response or a questionable response, the worker will be removed immediately from the sewer.

Exception: *If the worker is disabled due to falling or impact, the worker must not be removed from the sewer unless there is immediate danger to the worker's life. Local rescue personnel must be notified immediately. The standby worker may not enter the sewer in this case, only trained rescue personnel (wearing self contained breathing apparatus) may enter to perform a rescue. A full-body harness with attached lifeline must be used by all workers entering the space with the free end of the line secured outside the entry opening. The standby worker must use the lifeline to attempt to rescue a disabled worker without entering the space and summon rescue services based on their assessment of the situation.*

- When practical, the full-body harness must suspend a person upright and a hoisting device or similar apparatus must be available for lifting workers out of the sewer.
- In any situation where their use may endanger the worker, use of a hoisting device or full-body harness and attached lifeline may be discontinued.
- When dangerous air contamination is attributable to flammable and/or explosive substances, lighting and electrical equipment must be Class 1, Division 1 rated per National Electrical Code and no ignition sources may be introduced into the area.
- Continuous gas monitoring must be performed during all sewer entry operations. If alarm conditions occur, entry personnel must exit the sewer and a new sewer entry permit issued.
- Rescue. Call the local rescue services for rescue. Where immediate hazards to injured personnel are present, workers at the site must implement emergency procedures without entering the sewer. Rescue entries into sewers must be made only by trained and properly equipped personnel.

Example 2. Workplace. Meat and poultry rendering plants.

Cookers and dryers are either batch or continuous in their operation. Multiple batch cookers are operated in parallel. When one unit of a multiple set is shut down for repairs, means are available to isolate that unit from the others which remain in operation.

Cookers and dryers are horizontal, cylindrical vessels equipped with a center, rotating shaft and agitator paddles or discs. If the inner shell is jacketed, it is usually heated with steam at pressures up to 150 psig (1034.25 kPa). The rotating shaft assembly of the continuous cooker or dryer is also steam heated.

(1) Potential hazards. The recognized hazards associated with cookers and dryers are the risk that employees could be:

(a) Struck or caught by rotating agitator;

(b) Engulfed in raw material or hot, recycled fat;

(c) Burned by steam from leaks into the cooker/dryer steam jacket or the condenser duct system if steam valves are not properly closed and locked out;

(d) Burned by contact with hot metal surfaces, such as the agitator shaft assembly, or inner shell of the cooker/dryer;

WAC 296-62-14173 (Cont.)

(e) Heat stress caused by warm atmosphere inside cooker/dryer;

(f) Slipping and falling on grease in the cooker/dryer;

(g) Electrically shocked by faulty equipment taken into the cooker/dryer;

(h) Burned or overcome by fire or products of combustion; or

(i) Overcome by fumes generated by welding or cutting done on grease covered surfaces.

(2) Permits.

- The supervisor in this case is always present at the cooker/dryer or other permit entry confined space when entry is made.
- The supervisor must follow the preentry isolation procedures described in the entry permit in preparing for entry, and ensure that the protective clothing, ventilating equipment and any other equipment required by the permit are at the entry site.

(3) Control of hazards. Mechanical.

- Lock out main power switch to agitator motor at main power panel.
- Affix tag to the lock to inform others that a permit entry confined space entry is in progress.

(4) Engulfment.

- Close all valves in the raw material blow line.
- Secure each valve in its closed position using chain and lock.
- Attach a tag to the valve and chain warning that a permit entry confined space entry is in progress.
- The same procedure must be used for securing the fat recycle valve.

(5) Burns and heat stress.

- Close steam supply valves to jacket and secure with chains and tags.
- Insert solid blank at flange in cooker vent line to condenser manifold duct system.
- Vent cooker/dryer by opening access door at discharge end and top center door to allow natural ventilation throughout the entry.
- If faster cooling is needed, use a portable ventilation fan to increase ventilation.
- Cooling water may be circulated through the jacket to reduce both outer and inner surface temperatures of cooker/dryers faster.
- Check air and inner surface temperatures in cooker/dryer to assure they are within acceptable limits before entering, or use proper protective clothing.

(6) Fire and fume hazards.

- Careful site preparation, such as cleaning the area within four inches (10.16 cm) of all welding or torch cutting operations, and proper ventilation are the preferred controls.
- All welding and cutting operations must be done in accordance with the requirements of chapter 296-24 WAC, Part I, Welding, cutting, and brazing.
- Proper ventilation may be achieved by local exhaust ventilation, or the use of portable ventilation fans, or a combination of the two practices.

WAC 296-62-14173 (Cont.)

(7) Electrical shock. Electrical equipment used in cooker/dryers must be in serviceable condition.

(8) Slips and falls. Remove residual grease before entering cooker/dryer.

(9) Attendant. The supervisor must be the attendant for employees entering cooker/dryers.

(10) Permit. The permit must specify how isolation must be done and any other preparations needed before making entry. This is especially important in parallel arrangements of cooker/dryers so that the entire operation need not be shut down to allow safe entry into one unit.

(11) Rescue. When necessary, the attendant must call the employer's trained rescue team or the local fire services as previously arranged.

Example 3. Workplace. Workplaces where tank cars, trucks, and trailers, dry-bulk tanks and trailers, railroad tank cars, and similar portable tanks are fabricated or serviced.

(1) During fabrication. These tanks and dry-bulk carriers are entered repeatedly throughout the fabrication process. These products are not configured identically, but the manufacturing processes by which they are made are very similar.

(a) Sources of hazards. In addition to the mechanical hazards arising from the risks that an entrant would be injured due to contact with components of the tank or the tools being used, there is also the risk that a worker could be injured by breathing fumes from welding materials or mists or vapors from materials used to coat the tank interior. In addition, many of these vapors and mists are flammable, so the failure to properly ventilate a tank could lead to a fire or explosion.

(b) Control of hazards.

(i) Welding. Local exhaust ventilation must be used to remove welding fumes once the tank or carrier is completed to the point that workers may enter and exit only through a manhole. (Follow the requirements of chapter 296-24 WAC, Part I, Welding, cutting and brazing, at all times.) Welding gas tanks may never be brought into a tank or carrier that is a permit entry confined space.

(ii) Application of interior coatings/linings.

- Atmospheric hazards must be controlled by forced air ventilation sufficient to keep the atmospheric concentration of flammable materials below ten percent of the lower flammable limit (LFL) (or lower explosive limit (LEL), whichever term is used locally).
- The appropriate respirators are provided and shall be used in addition to providing forced ventilation if the forced ventilation does not maintain acceptable respiratory conditions.

(c) Permits. Because of the repetitive nature of the entries in these operations, an “area entry permit” will be issued for a one-month period to cover those production areas where tanks are fabricated to the point that entry and exit are made using manholes.

(d) Authorization. Only the area supervisor may authorize an employee to enter a tank within the permit area. The area supervisor must determine that conditions in the tank trailer, dry-bulk trailer or truck, etc., meet permit requirements before authorizing entry.

WAC 296-62-14173 (Cont.)

(e) Attendant.

- The area supervisor must designate an employee to maintain communication by employer specified means with employees working in tanks to ensure their safety.
- The attendant may not enter any permit entry confined space to rescue an entrant or for any other reason, unless authorized by the rescue procedure and, and even then, only after calling the rescue team and being relieved by an attendant by another worker.

(f) Communications and observation.

- Communications between attendant and entrant(s) must be maintained throughout entry.
- Methods of communication that may be specified by the permit include voice, voice-powered radio, tapping or rapping codes on tank walls, signaling tugs on a rope, and the attendant's observation that work activities such as chipping, grinding, welding, spraying, etc., which require deliberate operator control continue normally.
- These activities often generate so much noise that the necessary hearing protection makes communication by voice difficult.

(g) Rescue procedures.

- Acceptable rescue procedures include entry by a team of employee-rescuers, use of public emergency services, and procedures for breaching the tank.
- The area permit specifies which procedures are available, but the area supervisor makes the final decision based on circumstances. (Certain injuries may make it necessary to breach the tank to remove a person rather than risk additional injury by removal through an existing manhole.
- However, the supervisor must ensure that no breaching procedure used for rescue would violate terms of the entry permit. For instance, if the tank must be breached by cutting with a torch, the tank surfaces to be cut must be free of volatile or combustible coatings within four inches (10.16 cm) of the cutting line and the atmosphere within the tank must be below the LFL.)

(h) Retrieval line and harnesses.

- The retrieval lines and harnesses generally required under this standard are usually impractical for use in tanks because the internal configuration of the tanks and their interior baffles and other structures would prevent rescuers from hauling out injured entrants.
- However, unless the rescue procedure calls for breaching the tank for rescue, the rescue team must be trained in the use of retrieval lines and harnesses for removing injured employees through manholes.

(2) Repair or service of “used” tanks and bulk trailers.

(a) Sources of hazards. In addition to facing the potential hazards encountered in fabrication or manufacturing, tanks or trailers which have been in service may contain residues of dangerous materials, whether left over from the transportation of hazardous cargoes or generated by chemical or bacterial action on residues of nonhazardous cargoes.

WAC 296-62-14173 (Cont.)

(b) Control of atmospheric hazards. A "used" tank must be brought into areas where tank entry is authorized only after the tank has been emptied, cleansed (without employee entry) of any residues, and purged of any potential atmospheric hazards.

(c) Welding. In addition to tank cleaning for control of atmospheric hazards, coating and surface materials must be removed four inches (10.16 cm) or more from any surface area where welding or other torch work will be done and care taken that the atmosphere within the tank remains well below the LFL. (Follow the requirements of chapter 296-24 WAC, Part I, Welding, cutting and brazing, at all times.)

(d) Permits.

- An entry permit valid for up to one year must be issued prior to authorization of entry into used tank trailers, dry-bulk trailers or trucks.
- In addition to the preentry cleaning requirement, this permit must require the employee safeguards specified for new tank fabrication or construction permit areas.

(e) Authorization.

- Only the area supervisor may authorize an employee to enter a tank trailer, dry-bulk trailer or truck within the permit area.
- The area supervisor must determine that the entry permit requirements have been met before authorizing entry.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14173, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14174 Appendix D--Sample permits.

WAC 296-62-17174, Appendix D, Sample A

WAC 296-62-14174, Appendix D, Sample B

WAC 296-62-14175 Appendix E--Sewer system entry. Sewer entry differs in three vital respects from other permit entries:

- There rarely exists any way to completely isolate the space (a section of a continuous system) to be entered;
- Because isolation is not complete, the atmosphere may suddenly and unpredictably become lethally hazardous (toxic, flammable or explosive) from causes beyond the control of the entrant or employer; and
- Experienced sewer workers are especially knowledgeable in entry and work in their permit spaces because of their frequent entries. Unlike other employments where permit space entry is a rare and exceptional event, sewer workers' usual work environment is a permit space.

(1) Adherence to procedure. The employer should designate as entrants only employees who are thoroughly trained in the employer's sewer entry procedures and who demonstrate that they follow these entry procedures exactly as prescribed when performing sewer entries.

(2) Atmospheric monitoring. Entrants should be trained in the use of, and be equipped with, atmospheric monitoring equipment which sounds an audible alarm, in addition to its visual readout, whenever one of the following conditions is encountered:

- Oxygen concentration less than 19.5 percent; flammable gas or vapor at ten percent or more of the lower flammable limit (LFL); or
- Hydrogen sulfide or carbon monoxide at or above 10 ppm or 35 ppm, respectively, measured as an eight-hour time-weighted average.

Atmospheric monitoring equipment needs to be calibrated according to the manufacturer's instructions. The oxygen sensor/broad range sensor is best suited for initial use in situations where the actual or potential contaminants have not been identified, because broad range sensors, unlike substance-specific sensors, enable employers to obtain an overall reading of the hydrocarbons (flammables) present in the space.

However, such sensors only indicate that a hazardous threshold of a class of chemicals has been exceeded. They do not measure the levels of contamination of specific substances. Therefore, substance-specific devices, which measure the actual levels of specific substances, are best suited for use where actual and potential contaminants have been identified.

The measurements obtained with substance-specific devices are of vital importance to the employer when decisions are made concerning the measures necessary to protect entrants (such as ventilation or personal protective equipment) and the setting and attainment of appropriate entry conditions. However, the sewer environment may suddenly and unpredictably change, and the substance-specific devices may not detect the potentially lethal atmospheric hazards which may enter the sewer environment.

(a) Although WISHA considers the information and guidance provided above to be appropriate and useful in most sewer entry situations, the department emphasizes that each employer must consider the unique circumstances, including the predictability of the atmosphere, of the sewer permit spaces in the employer's workplace in preparing for entry. Only the employer can decide, based upon his or her knowledge of, and experience with permit spaces in sewer systems, what the best type of testing instrument may be for any specific entry operation.

(b) The selected testing instrument should be carried and used by the entrant in sewer line work to monitor the atmosphere in the entrant's environment, and in advance of the entrant's direction of movement, to warn the entrant of any deterioration in atmospheric condition. Where several entrants are working together in the same immediate location, one instrument, used by the lead entrant, is acceptable.

WAC 296-62-14175 (Cont.)

(3) Surge flow and flooding. Sewer crews should develop and maintain liaison, to the extent possible, with the local weather bureau and fire and emergency services in their area so that sewer work may be delayed or interrupted and entrants withdrawn whenever sewer lines might be suddenly flooded by rain or fire suppression activities, or whenever flammable or other hazardous materials are released into sewers during emergencies by industrial or transportation accidents.

(4) Special equipment. Entry into large bore sewers may require the use of special equipment. Such equipment might include such items as atmosphere monitoring devices with automatic audible alarms, escape self-contained breathing apparatus (ESCBA) with at least ten minute air supply (or other NIOSH approved self-rescuer), and waterproof flashlights, and may also include boats and rafts, radios and rope stand-offs for pulling around bends and corners as needed.

[Statutory Authority: RCW 49.17.010, .040, .050. 99-22 (Order 99-10), § 296-62-14175, filed 10/29/99, effective 02/01/2000.]

WAC 296-62-14176 Appendix F--Rescue team or rescue service evaluation criteria.

(1) This appendix provides guidance to employers in choosing an appropriate rescue service. It contains criteria that may be used to evaluate the capabilities both of prospective and current rescue teams. Before a rescue team can be trained or chosen, however, a satisfactory permit program, including an analysis of all permit-required confined spaces to identify all potential hazards in those spaces, must be completed. WISHA believes that compliance with all the provisions of chapter 296-62 WAC, Part M will enable employers to conduct permit space operations without recourse to rescue services in nearly all cases. However, experience indicates that circumstances will arise where entrants will need to be rescued from permit spaces. It is therefore important for employers to select rescue services or teams, either on-site or off-site, that are equipped and capable of minimizing harm to both entrants and rescuers if the need arises.

(2) For all rescue teams or services, the employer's evaluation should consist of two components:

- An initial evaluation, in which employers decide whether a potential rescue service or team is adequately trained and equipped to perform permit space rescues of the kind needed at the facility and whether such rescuers can respond in a timely manner; and
- A performance evaluation, in which employers measure the performance of the team or service during an actual or practice rescue.

For example, based on the initial evaluation, an employer may determine that maintaining an on-site rescue team will be more expensive than obtaining the services of an off-site team, without being significantly more effective, and decide to hire a rescue service. During a performance evaluation, the employer could decide, after observing the rescue service perform a practice rescue, that the service's training or preparedness was not adequate to effect a timely or effective rescue at his or her facility and decide to select another rescue service, or to form an internal rescue team.

(a) Initial evaluation.

(i) The employer should meet with the prospective rescue service to facilitate the evaluations required by WAC 296-62-14150 (1)(a) and (b).

- At a minimum, if an off-site rescue service is being considered, the employer must contact the service to plan and coordinate the evaluations required by the standard.
- Merely posting the service's number or planning to rely on the 911 emergency phone number to obtain these services at the time of a permit space emergency would not comply with WAC 296-62-14150(1).

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(ii) The capabilities required of a rescue service vary with the type of permit spaces from which rescue may be necessary and the hazards likely to be encountered in those spaces. Answering the questions below will assist employers in determining whether the rescue service is capable of performing rescues in the permit spaces present at the employer's workplace.

(A) What are the needs of the employer with regard to response time (time for the rescue service to receive notification, arrive at the scene, and set up and be ready for entry)?

For example, if entry is to be made into an IDLH atmosphere, or into a space that can quickly develop an IDLH atmosphere (if ventilation fails or for other reasons), the rescue team or service would need to be standing by at the permit space. On the other hand, if the danger to entrants is restricted to mechanical hazards that would cause injuries (e.g., broken bones, abrasions) a response time of ten or fifteen minutes might be adequate.

(B) How quickly can the rescue team or service get from its location to the permit spaces from which rescue may be necessary?

Relevant factors to consider would include:

- The location of the rescue team or service relative to the employer's workplace;
- The quality of roads and highways to be traveled, potential bottlenecks or traffic congestion that might be encountered in transit;
- The reliability of the rescuer's vehicles; and
- The training and skill of its drivers.

(C) What is the availability of the rescue service?

- Is it unavailable at certain times of the day or in certain situations?
- What is the likelihood that key personnel of the rescue service might be unavailable at times?
- If the rescue service becomes unavailable while an entry is underway, does it have the capability of notifying the employer so that the employer can instruct the attendant to abort the entry immediately?

(D) Does the rescue service meet all the requirements of WAC 296-62-14150(2) of the standard?

- If not, has it developed a plan that will enable it to meet those requirements in the future?
- If so, how soon can the plan be implemented?

(E) For off-site services, is the service willing to perform rescues at the employer's workplace? (An employer may not rely on a rescuer who declines, for whatever reason, to provide rescue services.)

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(F) Is an adequate method for communications between the attendant, employer and prospective rescuer available so that a rescue request can be transmitted to the rescuer without delay? How soon after notification can a prospective rescuer dispatch a rescue team to the entry site?

(G) For rescues into spaces that may pose significant atmospheric hazards and from which rescue entry, patient packaging and retrieval cannot be safely accomplished in a relatively short time (fifteen to twenty minutes), employers should consider using airline respirators (with escape bottles) for the rescuers and to supply rescue air to the patient. If the employer decides to use SCBA, does the prospective rescue service have an ample supply of replacement cylinders and procedures for rescuers to enter and exit (or be retrieved) well within the SCBA's air supply limits?

(H) If the space has a vertical entry over five feet in depth, can the prospective rescue service properly perform entry rescues? Does the service have the technical knowledge and equipment to perform rope work or elevated rescue, if needed?

(I) Does the rescue service have the necessary skills in medical evaluation, patient packaging and emergency response?

(J) Does the rescue service have the necessary equipment to perform rescues, or must the equipment be provided by the employer or another source?

(b) Performance evaluation.

Rescue services are required by WAC 296-62-14150 (2)(c) of the standard to practice rescues at least once every twelve months, provided that the team or service has not successfully performed a permit space rescue within that time. As part of each practice session, the service should perform a critique of the practice rescue, or have another qualified party perform the critique, so that deficiencies in procedures, equipment, training, or number of personnel can be identified and corrected. The results of the critique, and the corrections made to respond to the deficiencies identified, should be given to the employer to enable it to determine whether the rescue service can quickly be upgraded to meet the employer's rescue needs or whether another service must be selected. The following questions will assist employers and rescue teams and services evaluate their performance.

(i) Have all members of the service been trained as permit space entrants, at a minimum, including training in the potential hazards of all permit spaces, or of representative permit spaces, from which rescue may be needed? Can team members recognize the signs, symptoms, and consequences of exposure to any hazardous atmospheres that may be present in those permit spaces?

(ii) Is every team member provided with, and properly trained in, the use and need for PPE, such as SCBA or fall arrest equipment, which may be required to perform permit space rescues in the facility? Is every team member properly trained to perform his or her functions and make rescues, and to use any rescue equipment, such as ropes and backboards, that may be needed in a rescue attempt?

(iii) Are team members trained in the first aid and medical skills needed to treat victims overcome or injured by the types of hazards that may be encountered in the permit spaces at the facility?

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(iv) Do all team members perform their functions safely and efficiently? Do rescue service personnel focus on their own safety before considering the safety of the victim?

(v) If necessary, can the rescue service properly test the atmosphere to determine if it is IDLH?

(vi) Can the rescue personnel identify information pertinent to the rescue from entry permits, hot work permits, and MSDSs?

(vii) Has the rescue service been informed of any hazards to personnel that may arise from outside the space, such as those that may be caused by future work near the space?

(viii) If necessary, can the rescue service properly package and retrieve victims from a permit space that has a limited size opening (less than twenty-four inches (60.9 cm) in diameter), limited internal space, or internal obstacles or hazards?

(ix) If necessary, can the rescue service safely perform an elevated (high angle) rescue?

(x) Does the rescue service have a plan for each of the kinds of permit space rescue operations at the facility? Is the plan adequate for all types of rescue operations that may be needed at the facility? Teams may practice in representative spaces, or in spaces that are "worst-case" or most restrictive with respect to internal configuration, elevation, and portal size. The following characteristics of a practice space should be considered when deciding whether a space is truly representative of an actual permit space:

(A) Internal configuration.

(I) Open -- There are no obstacles, barriers, or obstructions within the space. One example is a water tank.

(II) Obstructed -- The permit space contains some type of obstruction that a rescuer would need to maneuver around. An example would be a baffle or mixing blade. Large equipment, such as a ladder or scaffold, brought into a space for work purposes would be considered an obstruction if the positioning or size of the equipment would make rescue more difficult.

(B) Elevation.

(I) Elevated -- A permit space where the entrance portal or opening is above grade by four feet or more. This type of space usually requires knowledge of high angle rescue procedures because of the difficulty in packaging and transporting a patient to the ground from the portal.

(II) Nonelevated -- A permit space with the entrance portal located less than four feet above grade. This type of space will allow the rescue team to transport an injured employee normally.

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(C) Portal size.

(I) Restricted -- A portal of twenty-four inches or less in the least dimension. Portals of this size are too small to allow a rescuer to simply enter the space while using SCBA. The portal size is also too small to allow normal spinal immobilization of an injured employee.

(II) Unrestricted -- A portal of greater than twenty-four inches in the least dimension. These portals allow relatively free movement into and out of the permit space.

(D) Space access.

(I) Horizontal -- The portal is located on the side of the permit space. Use of retrieval lines could be difficult.

(II) Vertical -- The portal is located on the top of the permit space, so that rescuers must climb down, or the bottom of the permit space, so that rescuers must climb up to enter the space. Vertical portals may require knowledge of rope techniques, or special patient packaging to safely retrieve a downed entrant.

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